

# Toy Box

*How do you get kids to put their toys in a toy box? Make it look like a toy itself. This one is large enough to hold plenty of toys, yet it has a false bottom that adjusts so that even the smallest kids can reach inside.*



**T**his toy box looks so much like a toy, it might even get used. Apart from looking like a lot of fun, we tried to design it with kids in mind. The lids are supported with slow-closing lid supports, so they won't slam on little fingers. Curious fingers will also find rounded edges both inside and out. And, the bottom rests on adjustable shelf supports so it can be raised for even the shortest arms to reach the bottom.

**CONSTRUCTION.** The construction of the box is fairly simple. We used maple plywood for the sides and added solid maple strips at the corners so we could round them over. The front and back have mitered frames with a large glued-on letter and number. (Woodsmith Project Supplies is offering full-size pat-

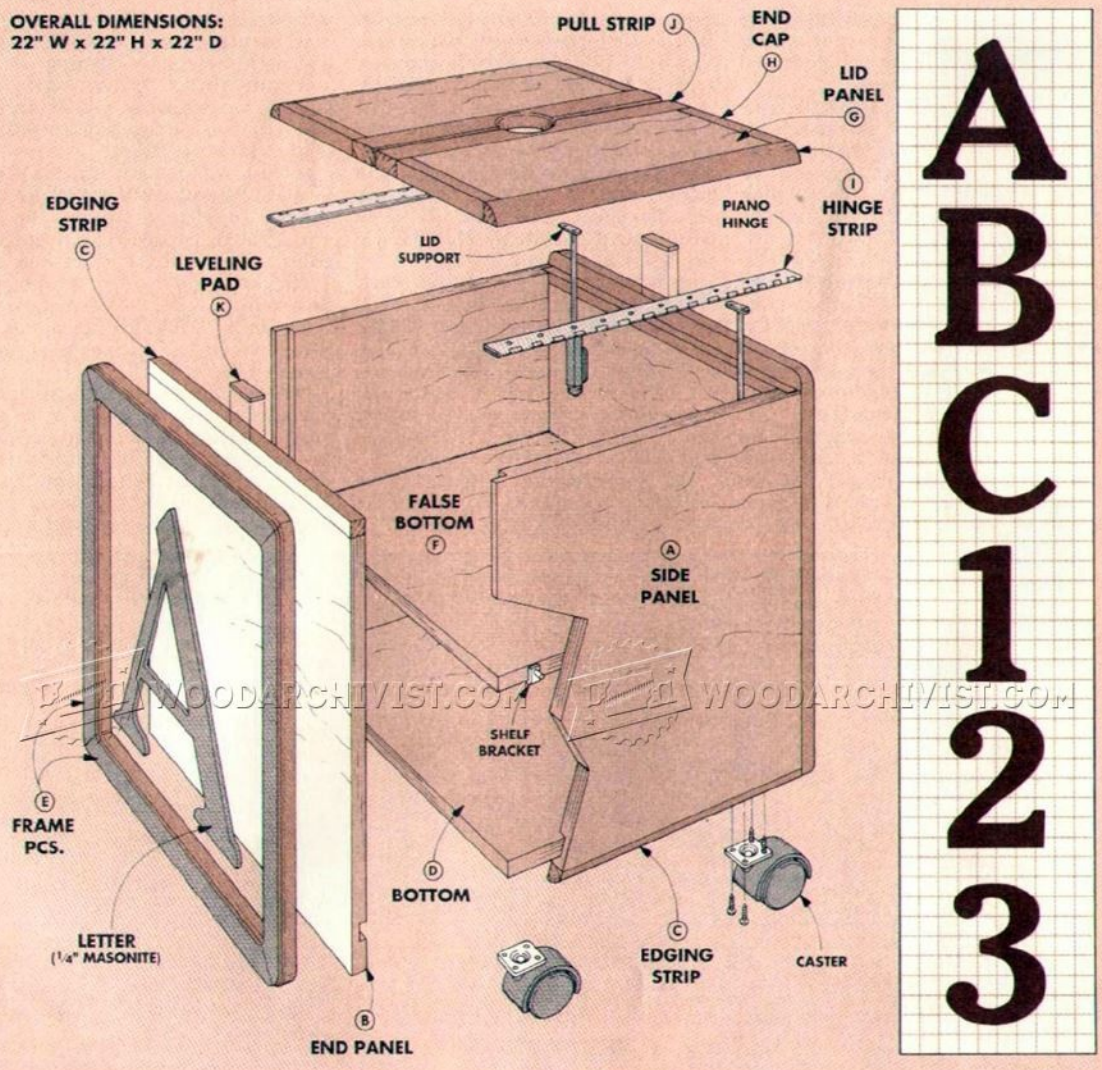
terns for the letters and numbers and a complete hardware kit for the toy box, see Sources, page 31.)

**HARDWARE.** There's actually more hardware on this project than meets the eye. The lids are attached to the sides with piano hinges, and supported with slow-closing lid supports. There's a false bottom that rests on adjustable shelf supports. And the real bottom is positioned to allow room for casters (so Mom or Dad can roll the toy box to where the mess is).

**FINISH.** One of the advantages of using maple is that it presents a good surface for painting. I painted the boxes with bright primary colors. After the paint dried, I applied two coats of gloss polyurethane varnish over the entire toy box to protect the paint from chipping.

## EXPLODED VIEW

OVERALL DIMENSIONS:  
22" W x 22" H x 22" D



## MATERIALS

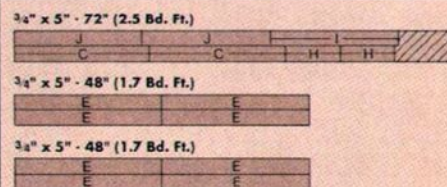
### WOOD PARTS

- A Side Panels (2) 3/4 ply - 20 5/16 x 20 1/2
- B End Panels (2) 3/4 ply - 20 5/16 x 21 1/2
- C Edg. Strips (4) 3/4 x 3/4 x 22
- D Bottom (1) 3/4 ply - 21 1/4 x 19 3/4
- E Frame Pcs. (8) 3/4 x 2 - 24 rgh.
- F False Btm. (1) 3/4 ply - 18 3/4 x 20 1/4
- G Lid Panel (2) 3/4 ply - 8 3/16 x 18 3/4
- H End Caps (4) 3/4 x 3/4 - 8 3/16
- I Hinge Strips (2) 3/4 x 3/4 - 20 1/4
- J Pull Strips (2) 3/4 x 2 - 20 1/4
- K Lev. Pads (2) 3/16 x 3/4 - 2

### SUPPLIES

- 5.9 Board Ft. of 3/4"-thick maple.
- 1 sheet 3/4"-thick maple plywood
- (2 pcs.) 1/4" Masonite 16" x 16"
- 1 Qt. gloss polyurethane varnish
- White enamel spray paint
- (2 colors) Enamel spray paint
- (2) Hinges 1 1/2" x 20 1/4" w/screws
- (2) Lid supports
- 1 1/2" Finish nails
- (4) Shelf brackets
- (4) 2" Casters

## CUTTING DIAGRAM



ALSO REQUIRED:  
1 SHEET (4' x 8') OF 3/4" PLYWOOD  
1/4 SHEET (2' x 4') OF 1/4" MASONITE

## THE BOX



I began building the toy box by making the four side and end panels.

**BLANKS.** To make the side panels (A) and end panels (B) start by cutting four blanks of  $\frac{3}{4}$ "-thick plywood to a rough width of 22" and a rough length of 22", see Fig. 1.

**EDGING STRIPS.** To hide the edges of the plywood and allow for routing a rounded edge later, I glued  $\frac{3}{4}$ " x  $\frac{3}{4}$ " hardwood edging to one edge of each plywood panel. Cut the edging strips (C) to a finished length of 22" and glue them flush along one edge of each blank, see Fig. 1. Keep the ends of the blank and the ends of the strip flush.

**TRIM BLANKS.** Once the edging strips are glued to the blanks, the side and end panels can be trimmed to their finished size. The width of the side and end panels (which is actually the height of the box) is the same on

all four panels. To trim the panels to width, place the hardwood edging strip (C) of each blank against the table saw rip fence and cut each panel to a finished width of  $21\frac{1}{16}$ ", see second step in Fig. 1.

After the panels have been cut to the same width, the next step is to cut them to length. Start by cutting the side panels (A) to a finished length of  $20\frac{1}{2}$ ", see Fig. 2. Next, since the end panels (B) will sit in  $\frac{1}{2}$ "-deep rabbets, cut them 1" longer than the side panels ( $21\frac{1}{2}$ " ), see Fig. 2.

**GROOVES.** Once the side and end panels have been trimmed to size, the next step is to cut a groove in each piece to accept the bottom of the toy box. Before cutting the grooves, take a minute to orient the pieces, see Exploded View, page 7. On the side panels (A), the edging strip is on the bottom. On the end panels (B), the strip is located on top to hide the exposed plywood edge.

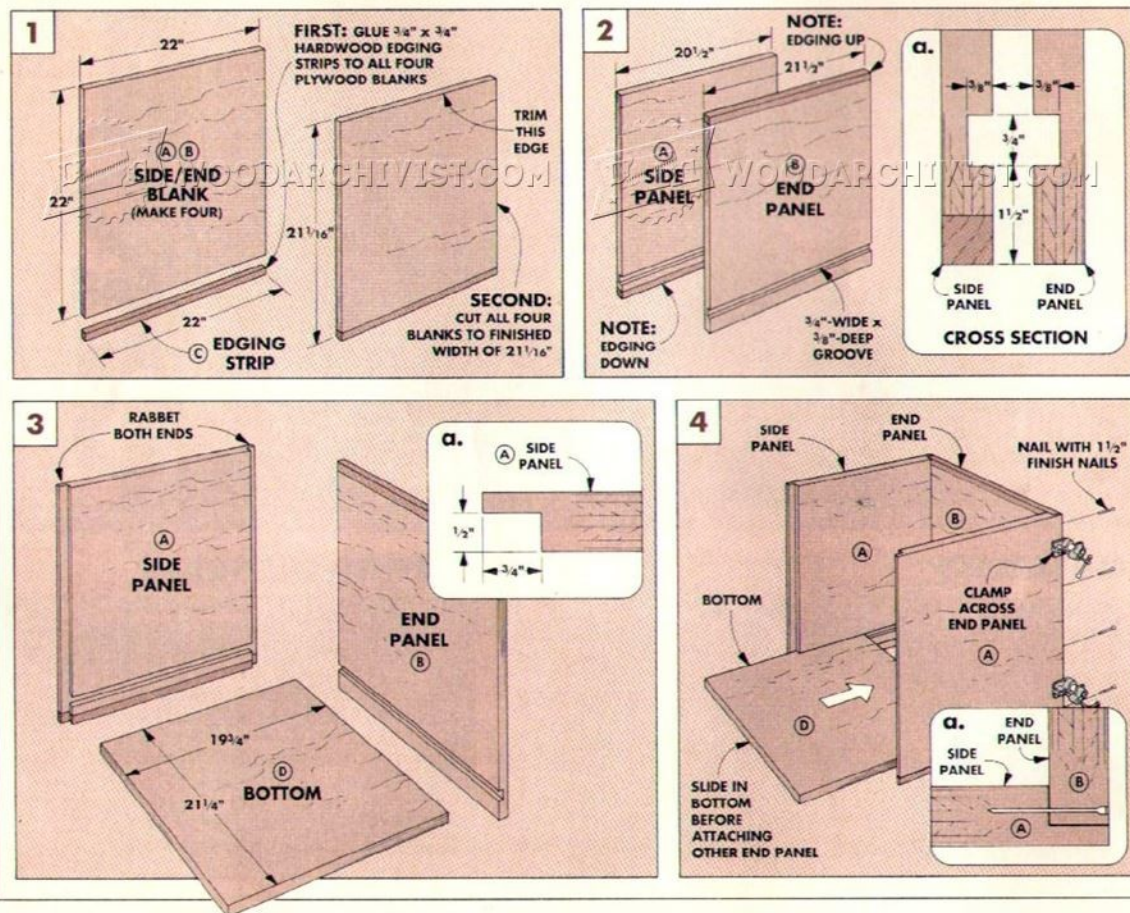
The  $\frac{3}{8}$ "-deep grooves are located on the inside faces of the panels,  $1\frac{1}{2}$ " up from the bottom edges, see Fig. 2a. I used a  $\frac{3}{4}$ "-

straight router bit to cut these grooves. (You could use a table saw and an adjustable dado blade set to the thickness of the plywood.)

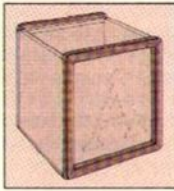
**CUT THE RABBIT.** Next, to join the end panels to the side panels, rout  $\frac{3}{4}$ "-wide by  $\frac{1}{2}$ "-deep rabbets on the inside faces of both side panels (A), see Fig. 3a.

**BOTTOM.** With the side and end panels complete, the next step is to make the bottom (D). To determine the size of the bottom, dry clamp the side and end panels together and measure the inside width and length. Next, add  $\frac{3}{4}$ " to each dimension so the bottom will fit into the  $\frac{3}{8}$ "-deep grooves in the panels. The bottom can now be cut from a piece of  $\frac{3}{4}$ "-thick plywood (mine measured  $21\frac{1}{4}$ " x  $19\frac{3}{4}$ " ).

**ASSEMBLY.** Begin assembly by gluing one end panel (B) into the rabbets of the side panels (A) to form a U-shaped subassembly, see Fig. 4. Next, slide in the bottom (D) and secure the end panel to the sides with  $\frac{1}{2}$ " finishing nails see Fig. 4a. Finally, glue, clamp, and nail the other end panel in place.



## FRAMES



Once you've assembled the box, work can begin on the frames. The frames hide the exposed plywood rabbet joints and give the toy box its building block look.

**CUT FRAME PIECES.** Start by ripping eight frame pieces (E) to a finished width of 2" and a rough length of 24". Next, miter the ends of the frames so their finished length (long-point to long-point) equals the distance across one end of the box, see Fig. 5. (In my case this measured 22".) Note: The top and side frame pieces will extend  $\frac{15}{16}$ " above the end panels (B) so they'll be flush with the tops of the lids once they're installed, refer to Fig. 18.

**ATTACH FRAMES.** After the frames have been mitered to size, they can be glued to the ends of the box. Start by gluing and clamping one frame piece flush to the bottom of the box, see Fig. 5. Next, glue two upright frame pieces flush with each side panel. Finally, glue the top frame pieces in place. (I used C-clamps to hold these.)

**ROUND OVER EDGES.** After the frame pieces are glued on, the next step is to rout a radius on the top corners of each frame, see

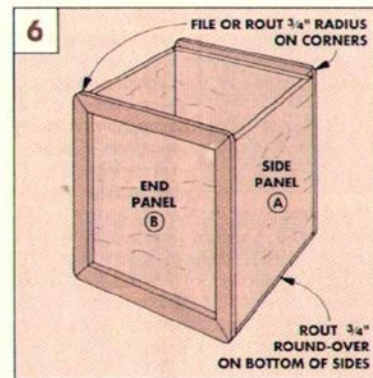
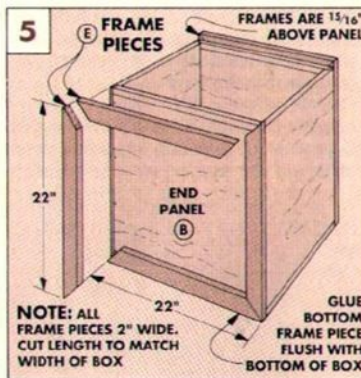


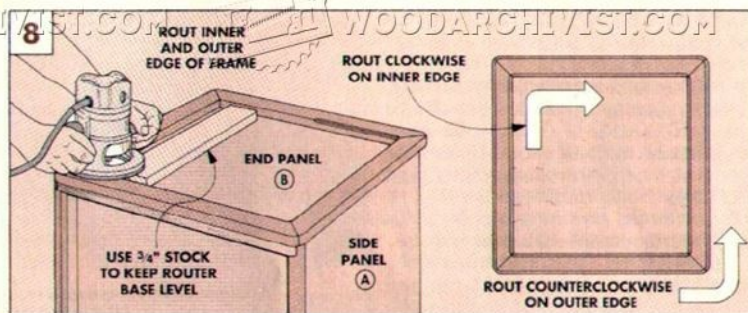
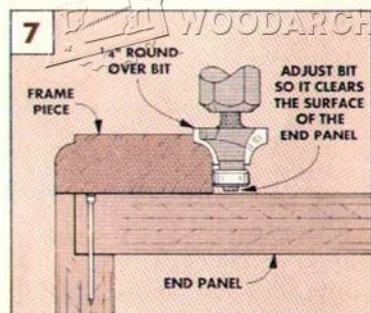
Fig. 6. I did this with a router and a  $\frac{3}{4}$ " round-over bit. (For more on this technique, see Shop Notes on page 16.) Then, I used the same bit to round over the bottom edges of the sides, see Fig. 6 and also page 16.

**Shop Note:** I chose the  $\frac{3}{4}$ " round-over bit because it provides a smooth transition between the hardwood edging strips and the plywood. If you don't have this bit, you could use a  $\frac{1}{2}$ " round-over bit.

**DECORATIVE EDGE.** After the  $\frac{3}{4}$ " radius is routed, rout a  $\frac{1}{4}$ " round-over with a shoulder on the inside and outside edges of the

frames, see Fig. 7. This shoulder provides a crisp edge for masking and painting the faces of the frames later.

To rout the decorative edge, adjust the router bit so it just clears the surface of the end panel (B), see Fig. 7. When routing the inside edge of the frames, move the router in a clockwise direction. On the outside edges of the frames, move the router in a counterclockwise direction, see Fig. 8. **Shop Note:** To help keep the router from tipping into the panel, I placed a  $\frac{3}{4}$ "-thick temporary spacer inside the frame, see Fig. 8.

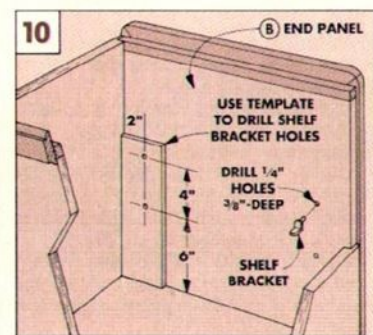
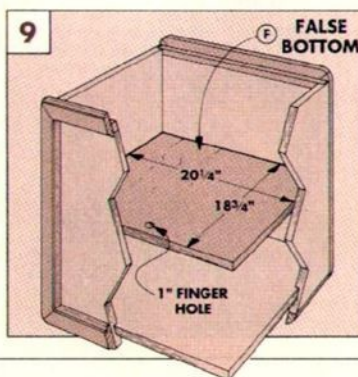


## FALSE BOTTOM

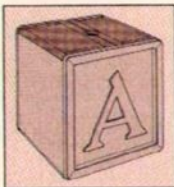
A false bottom can be added to make the toys accessible for smaller children.

The size of the false bottom (F) can be determined after the box is assembled. Start by measuring the inside dimensions, see Fig. 9. Then subtract  $\frac{1}{4}$ " (for the shelf brackets) from the width and length and cut the bottom (mine measured  $18\frac{3}{4}$ " x  $20\frac{1}{4}$ "). Next, so you can pull out the bottom, drill a 1" finger hole, centered 2" from one edge.

**SHELF BRACKETS.** The false bottom rests on L-shaped shelf brackets. These brackets are mounted in a series of four  $\frac{1}{4}$ " holes that are drilled into the inside face of each end panel (B), see Fig. 10.



## THE LIDS



The toy box has two lids which open up from the center. Each lid consists of a plywood panel edged with hardwood, see Fig. 11.

**LID PANELS.** I began the lids by first determining the size of the plywood lid panels (G). To determine the length of the panels, start by measuring the *inside* distance between the two mitered end frames. Then, subtract  $\frac{1}{4}$ " for clearance and  $1\frac{1}{2}$ " for the two  $\frac{3}{4}$ "-wide end caps (H). (In my case the panels were  $18\frac{3}{4}$ " long, see Fig. 11.)

To determine the width of the lid panels, measure between the *outside* faces of the side panels (mine measured 22"). Now, subtract a total of  $5\frac{5}{8}$ " (4" for two pull strips (J),  $1\frac{1}{2}$ " for two hinge strips (I), and  $\frac{1}{8}$ " for the center gap between the lids). Then, divide this measurement in half to get the width of each panel (in my case,  $8\frac{3}{16}$ " wide). Now cut the two panels to size, see Fig. 11.

**EDGING STRIPS.** The edging strips that surround the lid panels hide the plywood edges. I ripped all the hardwood strips to the same thickness as the plywood ( $\frac{3}{4}$ "). Then, cut four **end caps** (H) to a finished width of  $\frac{3}{4}$ " and a rough length of 9". Next, cut two **hinge strips** (I) to a finished width of  $\frac{3}{4}$ " and a rough length of 21". And finally, cut two **pull strips** (J) to a finished width of 2" and a rough length of 21".

**ASSEMBLY.** After cutting the pieces to size, glue the end caps (H) onto the ends of the lid panels (G), see Fig. 11. Once the glue is dry, trim the end caps flush with the edges of the plywood. Next, glue the hinge strips (I) and pull strips (J) onto each lid panel, see Fig. 11. Then, after the glue dries, trim the strips flush with the outside edge of the end caps.

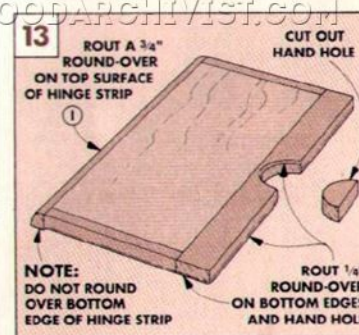
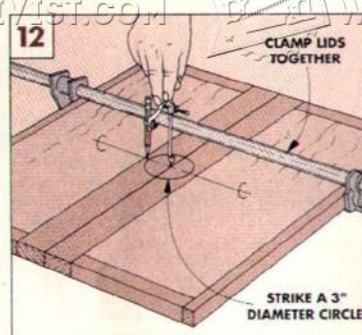
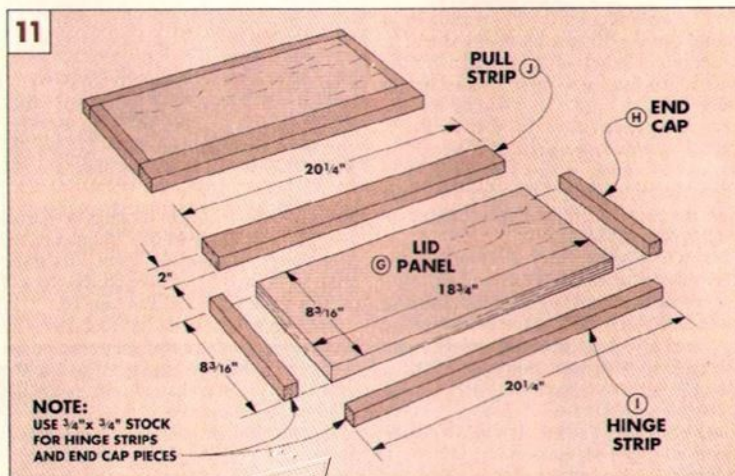
**HANDLE PULL.** The next step is to cut a hand hole in the pull strips so kids can open the lids easily. Clamp the lids together with the ends flush and the pull strips (J) facing

each other, see Fig. 12. Then, mark the center of the lid and lay out a 3" diameter circle. Next, cut out each half-circle and then sand the edges smooth, see Fig. 13.

**HINGE STRIPS.** With the pull strips complete, the next step is to round over the hinge strips (I) to match the radius on the corners of the frames, see Fig. 13. Here

again, I used the  $\frac{3}{4}$ " round-over bit.

**SOFTEN EDGES.** After rounding over the hinge strips, I removed the sharp edges on the lids. To do this, use a  $\frac{1}{4}$ " round-over bit to soften the hand hole in the pull strips (J), see Fig. 13. I also rounded over the bottom inside edges of each lid (except for the bottom of the hinge strips), see Fig. 13.

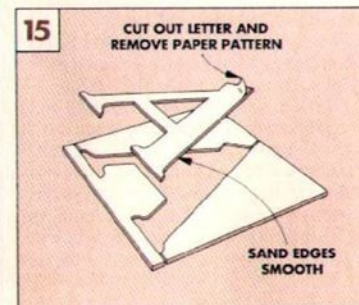
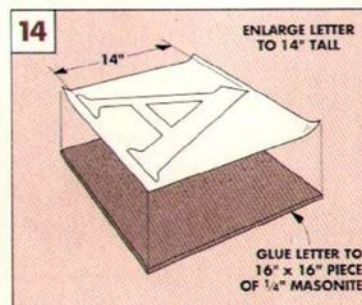


## LETTER & NUMBER

After the lids are complete, the next step is to cut out the letter and number that are glued onto the end panels.

**TRANSFER PATTERN.** Start by enlarging the desired patterns, see Exploded View, page 7. Next, transfer both patterns onto  $\frac{1}{4}$ "-thick Masonite. (I chose Masonite because the edges tear less than plywood.) I used 3M's Spray Mount to glue the enlarged pattern directly onto the Masonite, see Fig. 14.

**CUT OUT LETTER AND NUMBER.** Next, I used a sabre saw to cut out the letter and number and then sanded any rough edges smooth, see Fig. 15.



## FINISH

Before I glued the letter and number to the end panels, I applied a finish to the toy box. To achieve the look of a kid's building block, the end panels and the faces of the frames are painted, see Fig. 16.

**MASKING.** Before the end panels can be painted, the toy box must be masked off.

Start by masking off each end panel (B) where the letter or number will be located to provide an unfinished surface to glue to. To do this, center a letter or number on each end panel and trace lightly around it, see Fig. 17. Then, mask off a rough area within the traced outline.

Next, I masked off the edges and faces of the frame pieces, and covered the rest of the box with newspaper.

**PAINT PANELS.** After the panels are masked off, paint can be applied. I sprayed on two coats of white gloss enamel from an aerosol can. After the second coat is dry, remove the masking materials.

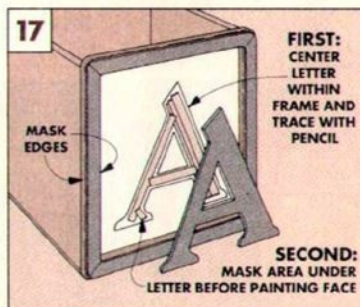
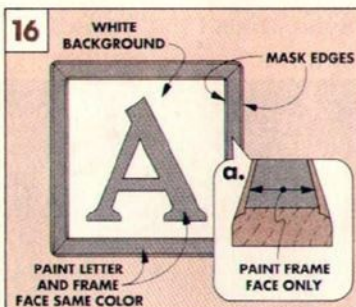
**PAINT FRAMES AND LETTER/NUMBER.** The next step is to paint the faces of the frames

and the letter or number with a bright color. Before the paint can be applied to the face of the frames, the edges of the frames must be masked off, see Fig. 16a. To do this, run a strip of masking tape around the molded edges of the frames. Then, mask off the end and side panels. Once this is done, paint the raised face of each frame and the letter or number with the same color. (I used red and

blue gloss spray enamel.)

**ATTACH LETTER AND NUMBER.** With the painting complete, remove all the masking materials and glue the letter and number onto the end panels.

**APPLY POLYURETHANE.** Finally, apply two coats of gloss polyurethane to the entire toy box (including the painted areas), sanding lightly between the coats.



## HARDWARE

The final step is to attach the lids (with piano hinges), the lid supports and the casters.

**INSTALL HINGES.** I screwed piano hinges on the side panels (A) and then attached the lids to the hinges. Start by cutting the 1 1/2" wide piano hinges to fit each side panel and screw them in place, see Fig. 18. (I used a self-centering hinge bit to drill the hinge screw holes, see Talking Shop, page 24).

**LEVEL LIDS.** To make positioning of the lids easier, I first leveled them flush with the top of the toy box. Since the lids sit on hinges, two leveling pads (K) are attached to the top edge of each end panel (B), see Fig. 18.

To do this, cut the pads the same thickness as the hinge knuckles (mine measured

3/16" thick) and 2" long. Then, center the pads on the end panels and nail them in place with small brads, see Fig. 18a. Finally, apply a coat of polyurethane to the leveling pads.

**ATTACH LIDS.** Once the pads are in place, the lids can be screwed to the hinges. To mark the hinge screw hole locations in the ends of each lid, I used locator pins, see Shop Notes, page 17. Position the lids on the hinges so the side-to-side gaps and the gap between the pull strips (J) are the same.

After the end hole locations are marked, drill a pilot hole for each screw. Then, secure each lid with two No. 4 x 5/8" woodscrews. Next, drill the remaining pilot holes with the hinge bit and install the rest of the screws.

**INSTALL LID SUPPORTS.** Once the lids are fastened, the lid supports can be installed. The lid supports I chose have three features that I really like. First, they ease the lids down slowly. Second, they're adjustable so as kids get older, the lids can close faster. Third, the supports have a detent position that "locks" the lids open. To install the supports, lay out the hole locations on each lid and end panel (B), see Fig. 19. Then, drill pilot holes (I used the hinge bit again) and fasten the supports in place.

**INSTALL CASTERS.** Finally, to make the toy box easy to move around, I installed casters on the bottom (D). Attach a caster 1 1/2" from each inside corner, see Fig. 20.

